7. A silicon etching apparatus as set forth in Claim 1 wherein said means for injecting nitrogen initially injects nitrogen to said etching chamber and thereafter to said loading chamber and said expansion chamber. - -

Attached hereto are additional pages reflecting a clean version of the specification and claims.

REMARKS

The Office Action dated December 10, 2001 has been fully considered by the Applicant. Examiner Hassanzadeh objected to the specification due to informalities, specifically on page 4. In accordance with the Examiner's objection, the specification has been amended.

The Examiner also objected to the Figure 1 of the drawings. Attached hereto is a replacement drawing showing the requested corrections. No new matter has been added.

The Examiner initially rejected claim 1 under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. As now amended, reconsideration of this rejection is requested. As the present invention is described as an apparatus where nitrogen is injected to eliminate the internal air moisture from the said three chambers, Applicant is of the opinion that it does not matter which of chambers should be connected to the "means for injecting nitrogen" as long as the said three chambers are connected with one another. Therefore, claim 1 has been amended to overcome the rejection under 35 USC § 112.

Claim 1 has initially been rejected under 35 USC § 102(b) as being anticipated by Patel et al (U.S. Patent No. 6,290,864). As now amended, reconsideration of this rejection is requested. Both the present invention and Patel et al relate to the etching apparatus comprising load chamber, expansion chamber, etching chamber and a means for nitrogen injection. However, Applicant's invention is utilized to minimize damage on a silicon oxide layer by eliminating the internal air moisture from the chambers and thus to prevent the formation of HF, whereas the invention of Patel is used to improve the selectivity of etching of a silicon portion relative to a non-silicon portion.

intended use

Further, in the present invention nitrogen is injected and then exhausted prior to the etching process. This is completely different from the invention to Patel et al which constitutes etching with a mixture of nitrogen and etchant. In summary, nitrogen is injected and then exhausted prior to the etching process.

Still further, the present invention comprises a means for injecting nitrogen and a means for exhausting nitrogen, whereas Patel et al's invention only has a means for injecting nitrogen.

In view of the above differences, claim 1 has been amended to overcome the rejection based on Patel et al and should now be in condition for allowance.

Claims 1 - 3 have initially been rejected under 35 USC § 102(b) as being anticipated by McQuarrie et al (Japan Patent 10-317169A). Reconsideration of this rejection is requested. In the present invention, nitrogen is injected and then exhausted prior to the etching process in order to eliminate air moisture from the chambers. In the patent to McQuarrie et al, an inert support gas is mixed with an etching agent and then together is supplied to the etching chamber to remove the impurities.

Claim 1 has been amended to distinguish the present invention from the cited references that do not include a means for exhausting nitrogen.

Further, the object of McQuarrie et al is to remove impurity rather than to remove moisture. There is no suggestion about removing moisture. Therefore, the object of injecting nitrogen in the present invention is different than the object of the cited references.

With respect to Claim 2, Applicant's invention includes an XeF_2 injector for uniformly injecting XeF_2 gas on the surface of a wafer with a viscous laminar downward. The invention to McQuarrie et al includes a showerhead in the top of etching chamber 11 as seen in Figure 1.

Another distinction between Applicant's invention and the patent to McQuarrie et al is Applicant's invention maintains the pressure of the loading chamber at the level higher than sublimation pressure of XeF_2 and lower than atmosphere pressure, in order to prevent sublimation of residual XeF_2 in the loading chamber after completion of process. McQuarrie et al maintains the pressure below the sublimation pressure of XeF_2 for continuous sublimation of XeF_2. Claim 3 has been amended to clearly distinguish it from the references cited.

Claim 4 has initially been rejected under 35 USC § 103(a) as being unpatentable over McQuarrie et al (Japan Patent 10-317169A) in view of Sinha et al (US Patent 6,123,765). Reconsideration of this rejection is requested. The Applicant respectfully disagrees with the Examiner's rejection of claim 4 under 35 USC § 103(a). Specifically, the combination of references, taken together, does not disclose the limitations of claim 4. Moreover, there is no teaching, suggestion, or disclosure that would support the combination of the instant invention and the patent to Sinha et al in the manner suggested by the Examiner. Absent some suggestion or motivation supporting the combination of references, the references may not properly be combined. "The mere

fact that references *can* be combined or modified does not render the resulting combination obvious unless the prior art suggests the desirability of the combination". M.P.E.P. Section 2143.01 (Emphasis in original). Further, it is necessary for the Examiner to set forth *evidence* that one of ordinary skill in the art would have been led to combine the teaching of the applied references. Accordingly, Applicant respectfully submits that claim 4 is allowable over the art of record.

The observations and conclusions are respectfully submitted for Examiner Hassanzadeh's consideration. It is believed that the foregoing is fully responsive to the outstanding Office Action and the application is now in condition for allowance and such action is earnestly solicited.

If Examiner Hassanzadeh believes that any additional amendments are required to place the claims in form for allowance he is respectfully invited to call the undersigned at (918) 587-2000 so that any remaining amendments can be taken care of in a telephone interview to thereby expedite allowance of the patent.

Respectfully submitted,

By _____
Mark G. Kachigian, Reg. No. 32,840
HEAD, JOHNSON & KACHIGIAN
228 West 17th Place
Tulsa, Oklahoma 74119
(918) 587-2000
Attorneys for Applicant